BUR[redacted]DOANE, SWECKER AND MATHIS LLP
APP[redacted]FILING DATE: JANUARY 12, 2001
TITLE: A PRINTER CONTROLLER THAT HAS A PRINTER...
ATTORNEY DOCKET NO: 018987-031
34 Sheets

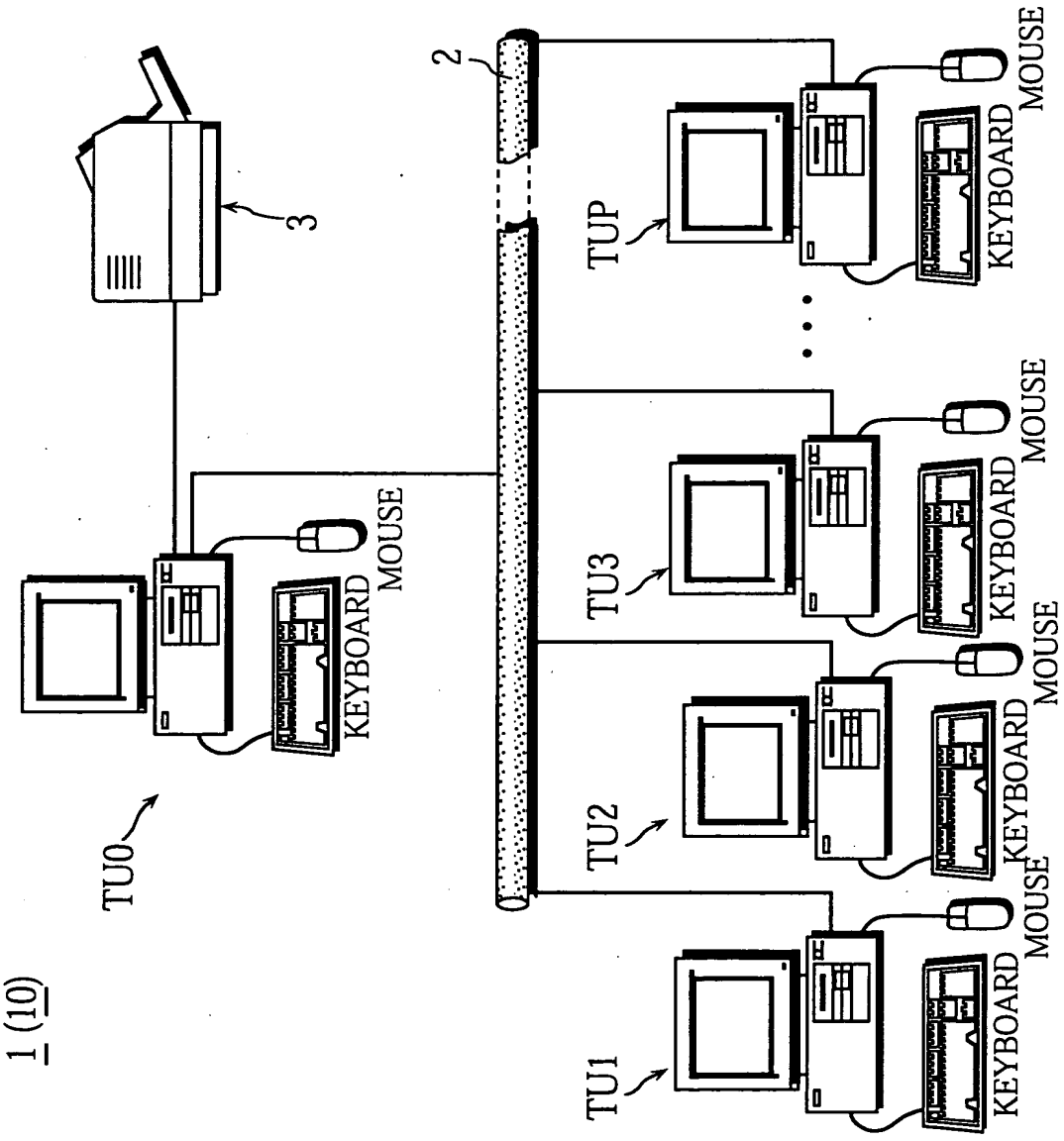


FIG.1 1 (10)

FIG. 2

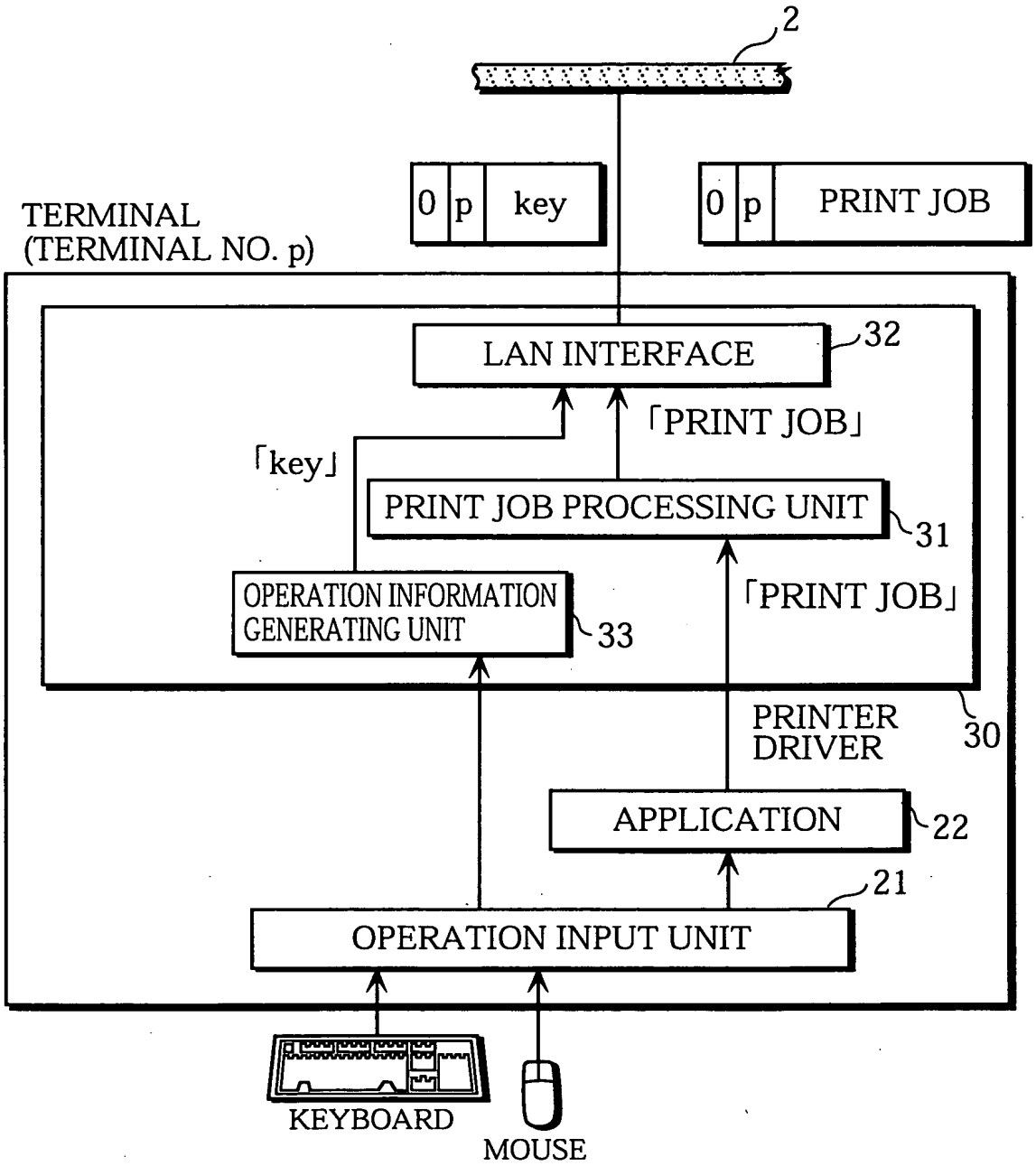

2
0 p key
0 p PRINT JOB
TERMINAL
(TERMINAL NO. p)
LAN INTERFACE
32
「PRINT JOB」
「key」
PRINT JOB PROCESSING UNIT
31
OPERATION INFORMATION GENERATING UNIT
33
「PRINT JOB」
PRINTER DRIVER
30
APPLICATION
22
21
OPERATION INPUT UNIT
KEYBOARD
MOUSE

FIG. 3

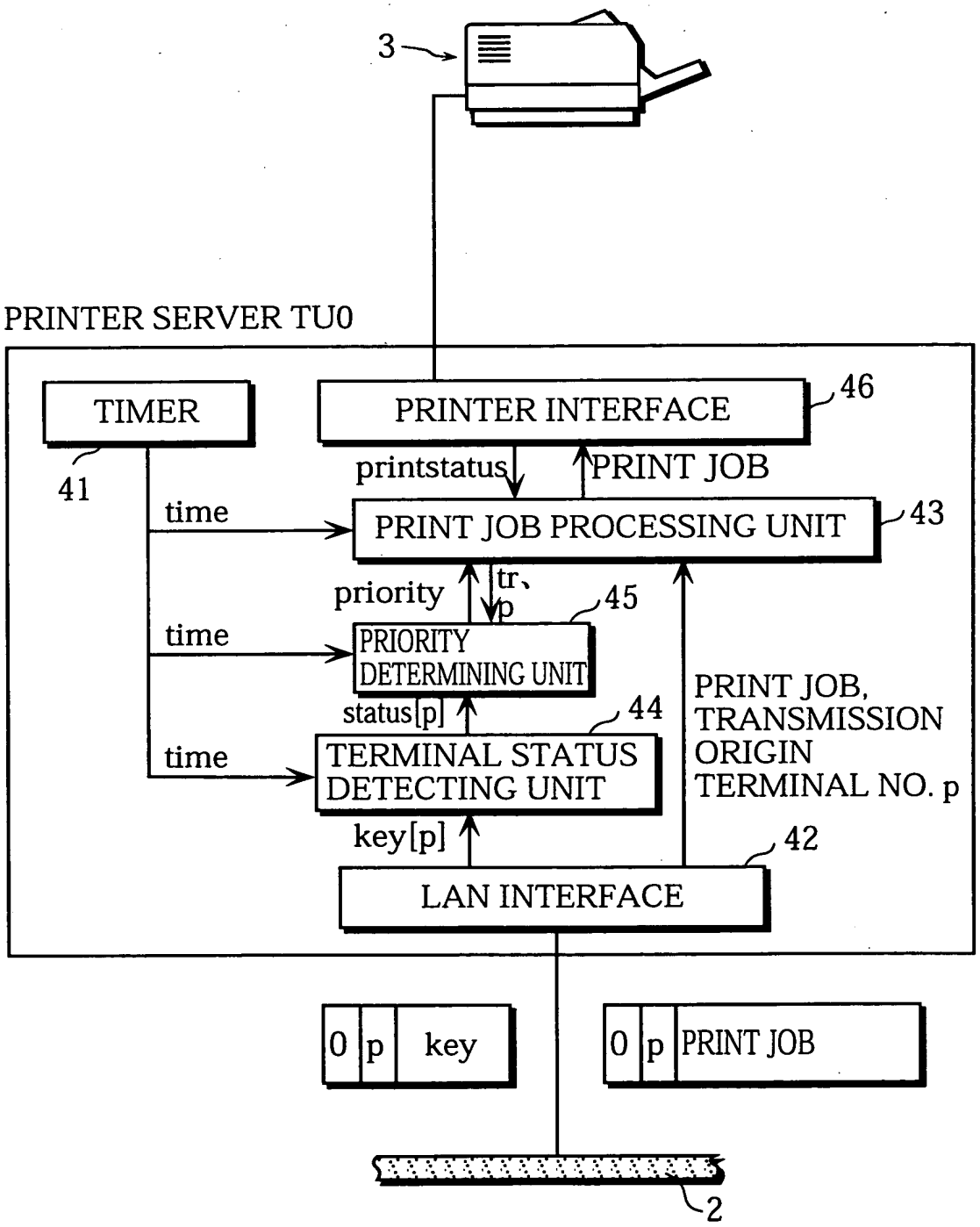

3
PRINTER SERVER TU0
TIMER
41
PRINTER INTERFACE
46
printstatus
PRINT JOB
time
PRINT JOB PROCESSING UNIT
43
priority
tr, p
45
time
PRIORITY DETERMINING UNIT
status[p]
44
time
TERMINAL STATUS DETECTING UNIT
PRINT JOB, TRANSMISSION ORIGIN TERMINAL NO. p
key[p]
42
LAN INTERFACE
0 p key
0 p PRINT JOB
2

FIG. 4

PRINT JOB BUFFER 431

BUFFER NO.	FLAG (ON/OFF)	PRINT JOB	TERMINAL NO. (p)	RECEPTION TIME (tr)	PRIORITY LEVEL (priority)
1					
2					
3					
n					
N					

FIG. 5

STATUS STORAGE TABLE441

TERMINAL NO.	RECEPTION TIME (tl)	EXPIRED TIME (tk)	STATUS
1			
2			
3			
p			
P			

FIG.6

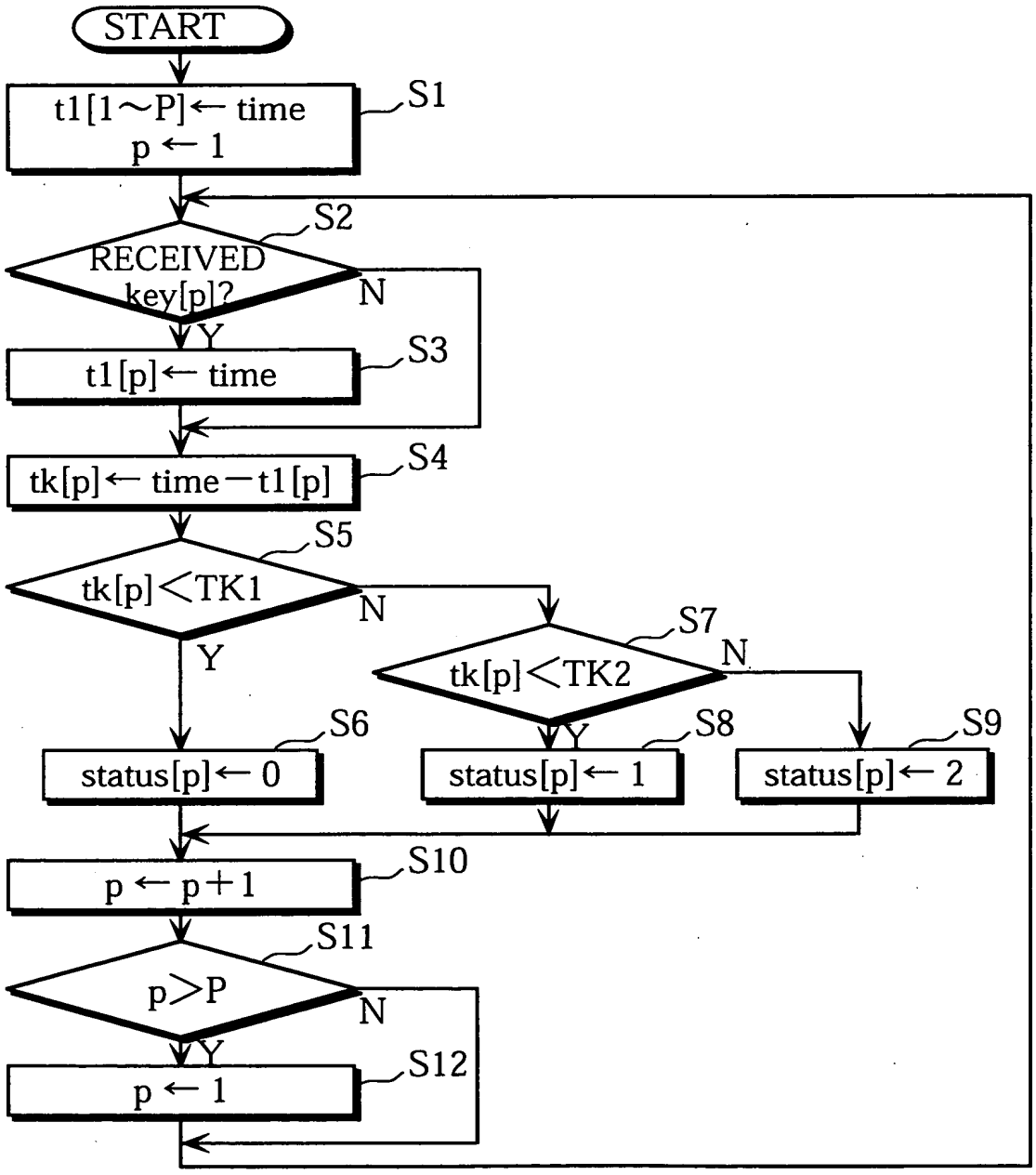

START
t1[1～P]← time
p ← 1
S1
S2
RECEIVED key[p]?
N
Y
t1[p]← time
S3
tk[p]← time－t1[p]
S4
S5
tk[p]＜TK1
N
Y
S7
tk[p]＜TK2
N
Y
S6
S8
S9
status[p]← 0
status[p]← 1
status[p]← 2
p ← p+1
S10
S11
p＞P
N
Y
p ← 1
S12

FIG. 7

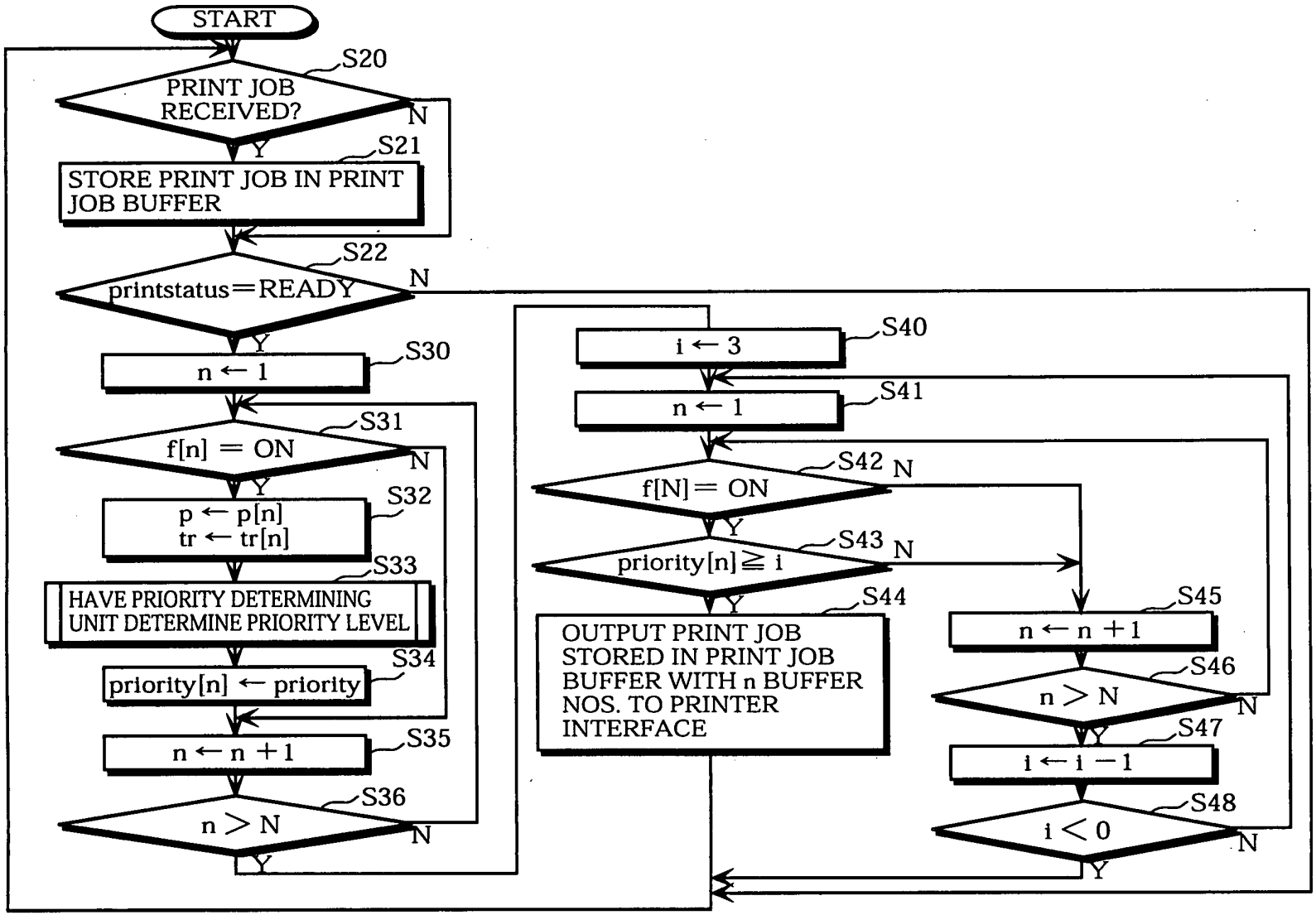

START
S20
PRINT JOB RECEIVED?
N
Y
S21
STORE PRINT JOB IN PRINT JOB BUFFER
S22
printstatus=READY
N
Y
S30
n ← 1
S31
f[n] = ON
N
Y
S32
p ← p[n]
tr ← tr[n]
S33
HAVE PRIORITY DETERMINING UNIT DETERMINE PRIORITY LEVEL
S34
priority[n] ← priority
S35
n ← n +1
S36
n > N
N
Y
S40
i ← 3
S41
n ← 1
S42
f[N]= ON
N
Y
S43
priority[n]≧ i
N
Y
S44
OUTPUT PRINT JOB STORED IN PRINT JOB BUFFER WITH n BUFFER NOS. TO PRINTER INTERFACE
S45
n ← n +1
S46
n > N
N
Y
S47
i ← i −1
S48
i < 0
N
Y

FIG.8

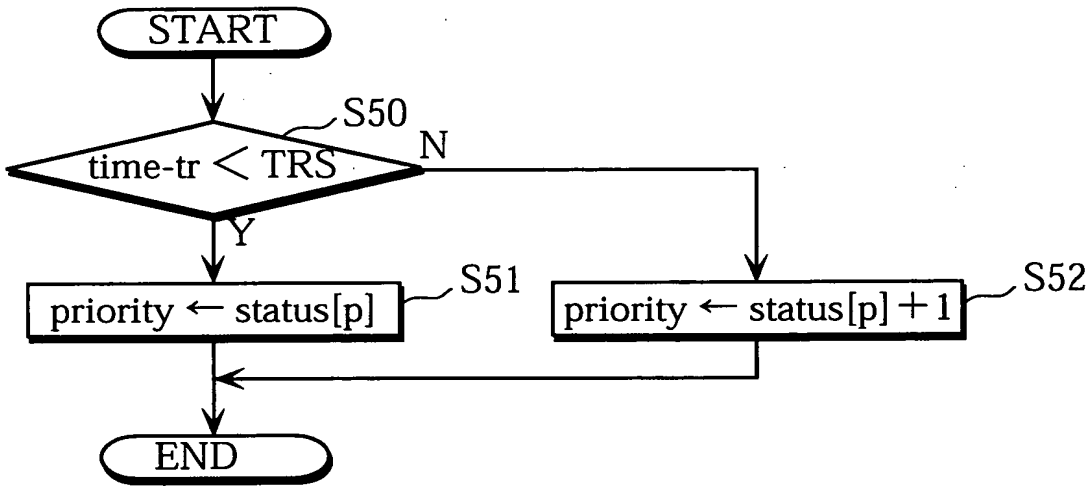

START
S50
time-tr < TRS
N
Y
priority ← status[p]
S51
priority ← status[p] + 1
S52
END

FIG.9

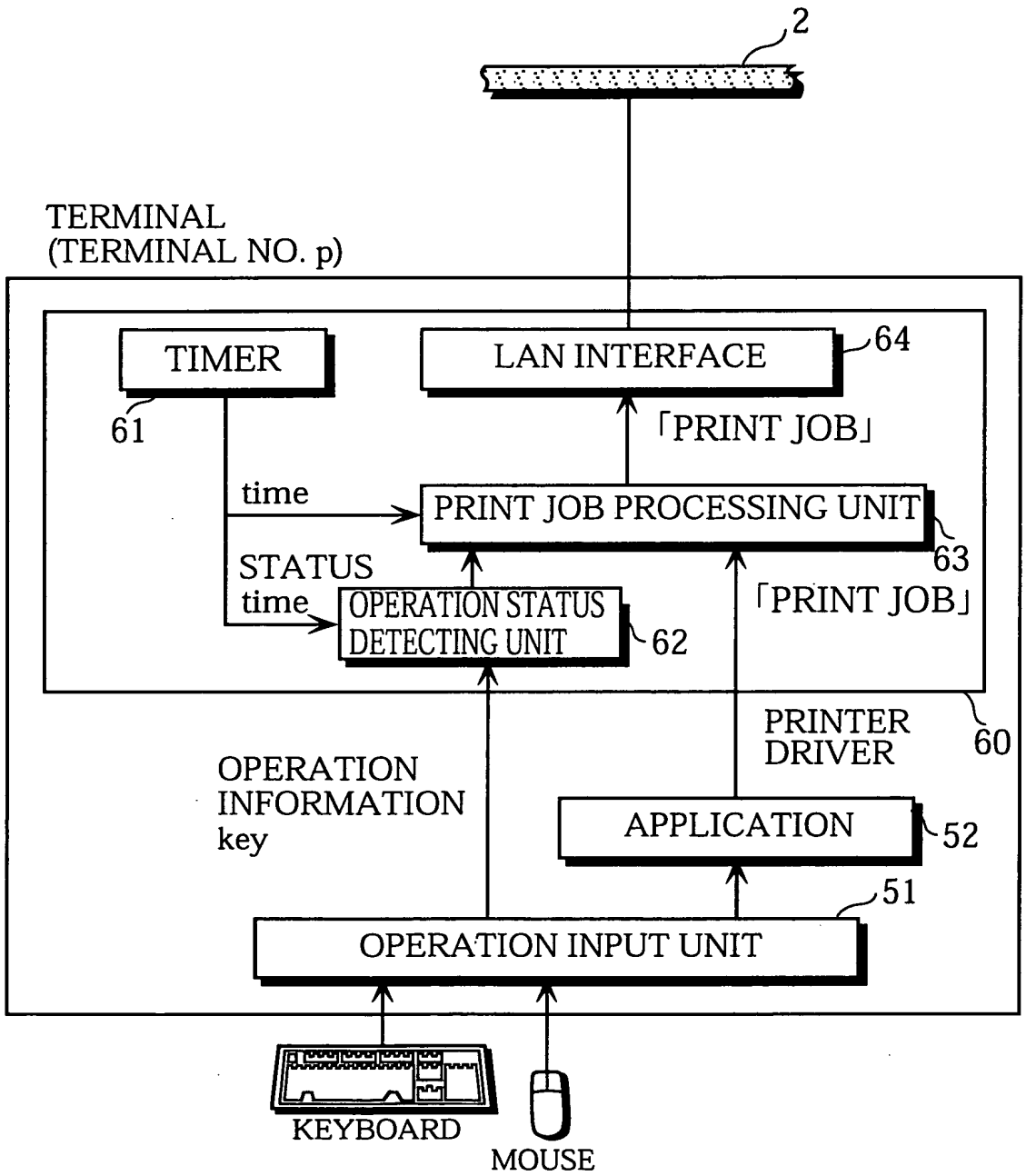

2
TERMINAL
(TERMINAL NO. p)
TIMER
61
LAN INTERFACE
64
「PRINT JOB」
time
PRINT JOB PROCESSING UNIT
63
STATUS
time
OPERATION STATUS
DETECTING UNIT
62
「PRINT JOB」
PRINTER
DRIVER
60
OPERATION
INFORMATION
key
APPLICATION
52
51
OPERATION INPUT UNIT
KEYBOARD
MOUSE

FIG. 10

STATUS STORAGE TABLE 621

RECEPTION TIME (tl)	
EXPIRED TIME (tk)	
STATUS	

FIG. 11

PRINT JOB BUFFER 631

BUFFER NO.	FLAG (ON/OFF)	PRINT JOB	RECEPTION TIME (tr)
1			
2			
3			
n			
N			

FIG. 12

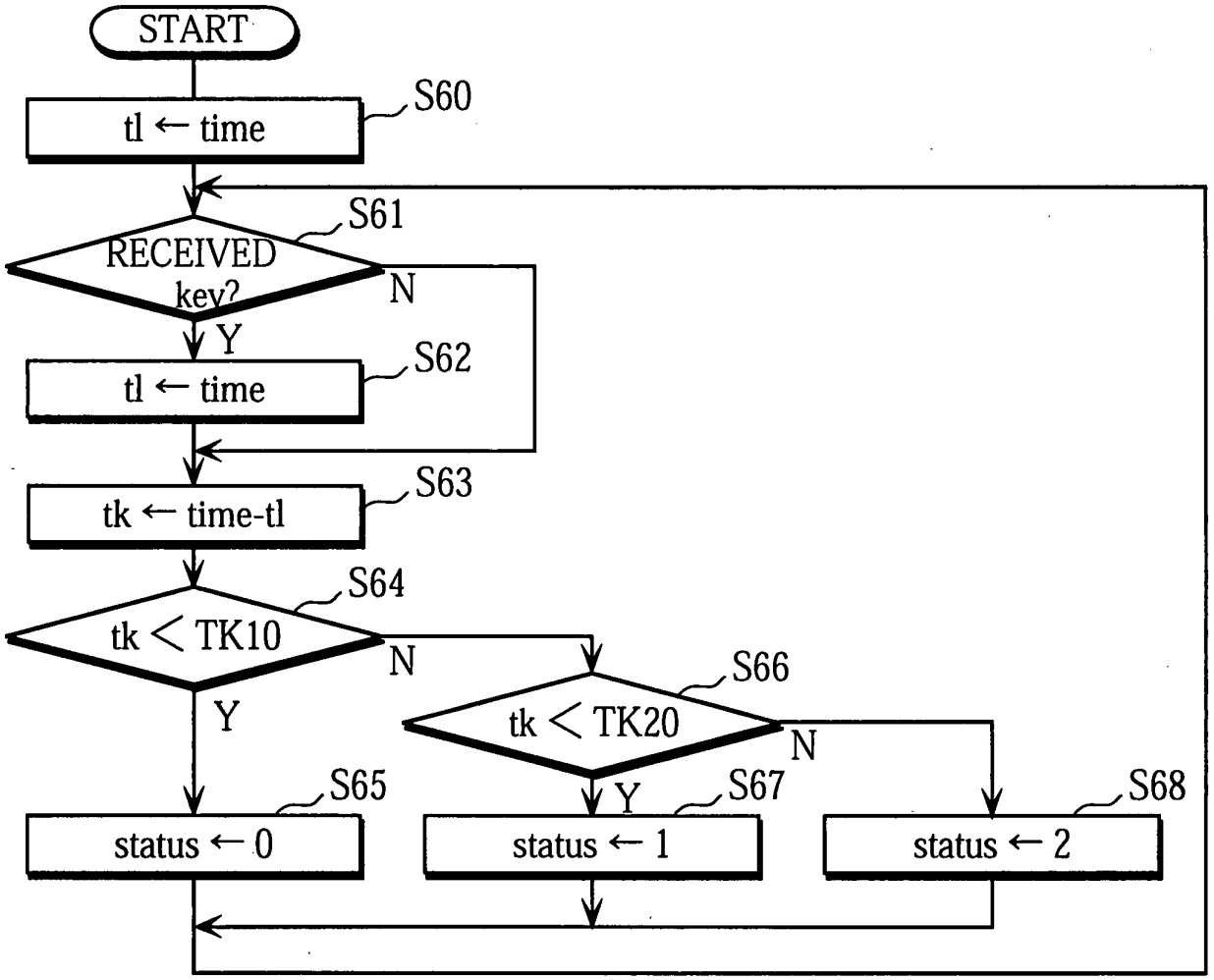

START
tl ← time
S60
S61
RECEIVED key?
N
Y
S62
tl ← time
S63
tk ← time-tl
S64
tk < TK10
N
Y
S66
tk < TK20
N
Y
S65
S67
S68
status ← 0
status ← 1
status ← 2

FIG. 13

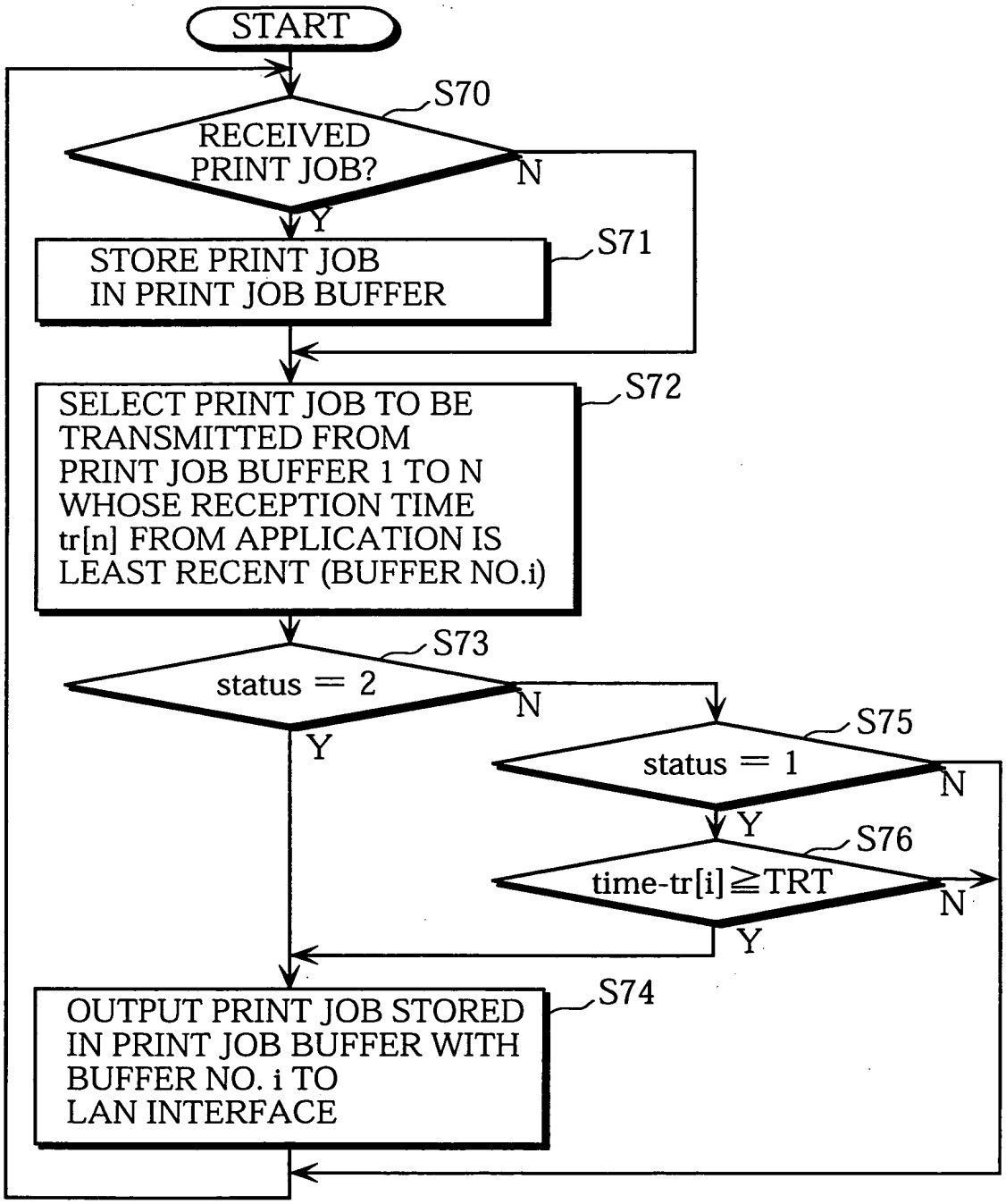

START
S70
RECEIVED PRINT JOB?
N
Y
S71
STORE PRINT JOB IN PRINT JOB BUFFER
S72
SELECT PRINT JOB TO BE TRANSMITTED FROM PRINT JOB BUFFER 1 TO N WHOSE RECEPTION TIME tr[n] FROM APPLICATION IS LEAST RECENT (BUFFER NO.i)
S73
status = 2
N
Y
S75
status = 1
N
Y
S76
time-tr[i]≧TRT
N
Y
S74
OUTPUT PRINT JOB STORED IN PRINT JOB BUFFER WITH BUFFER NO. i TO LAN INTERFACE

FIG.14

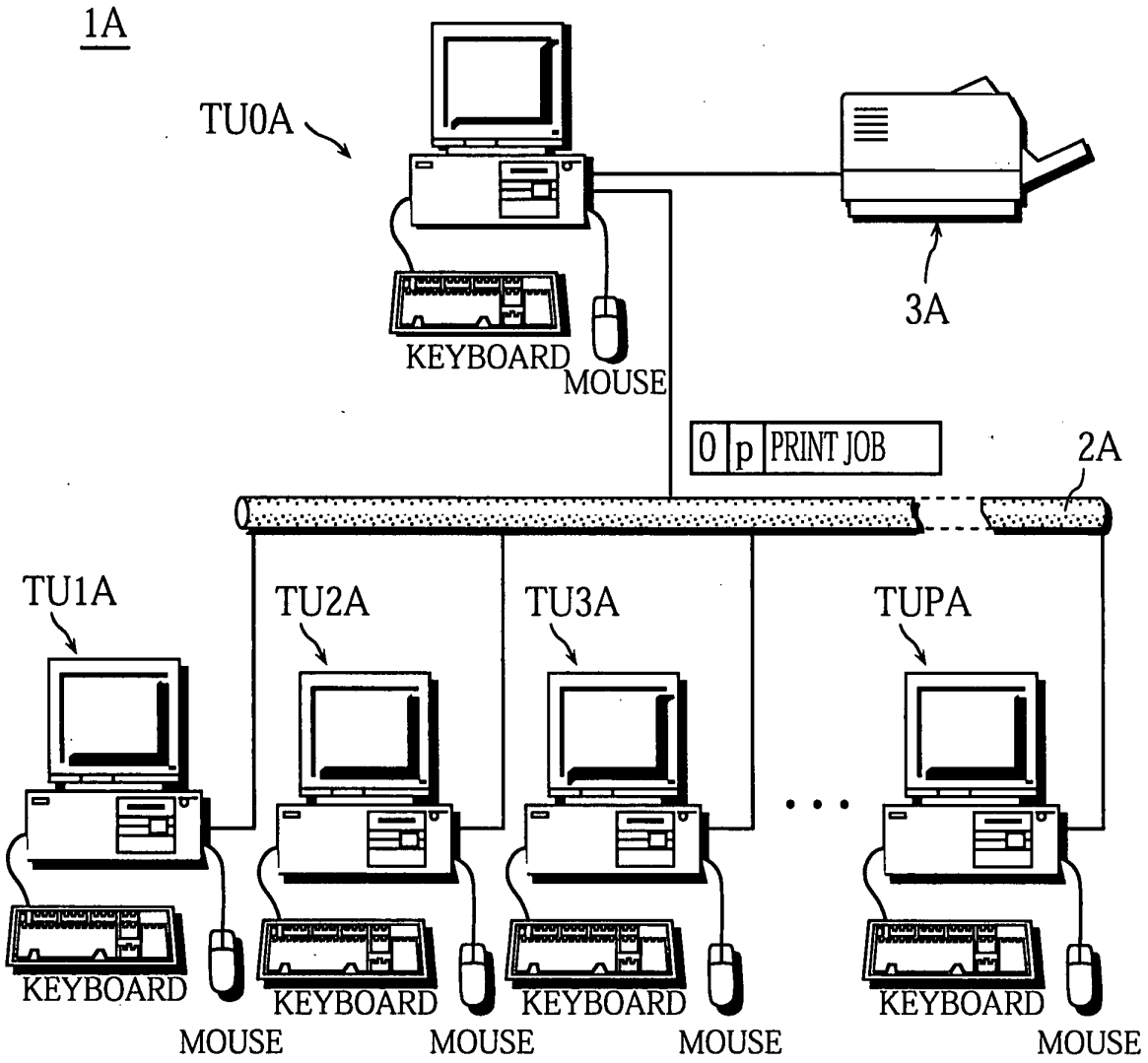

1A
TU0A
3A
KEYBOARD
MOUSE
0 p PRINT JOB
2A
TU1A
TU2A
TU3A
TUPA
KEYBOARD
KEYBOARD
KEYBOARD
KEYBOARD
MOUSE
MOUSE
MOUSE
MOUSE

FIG. 15

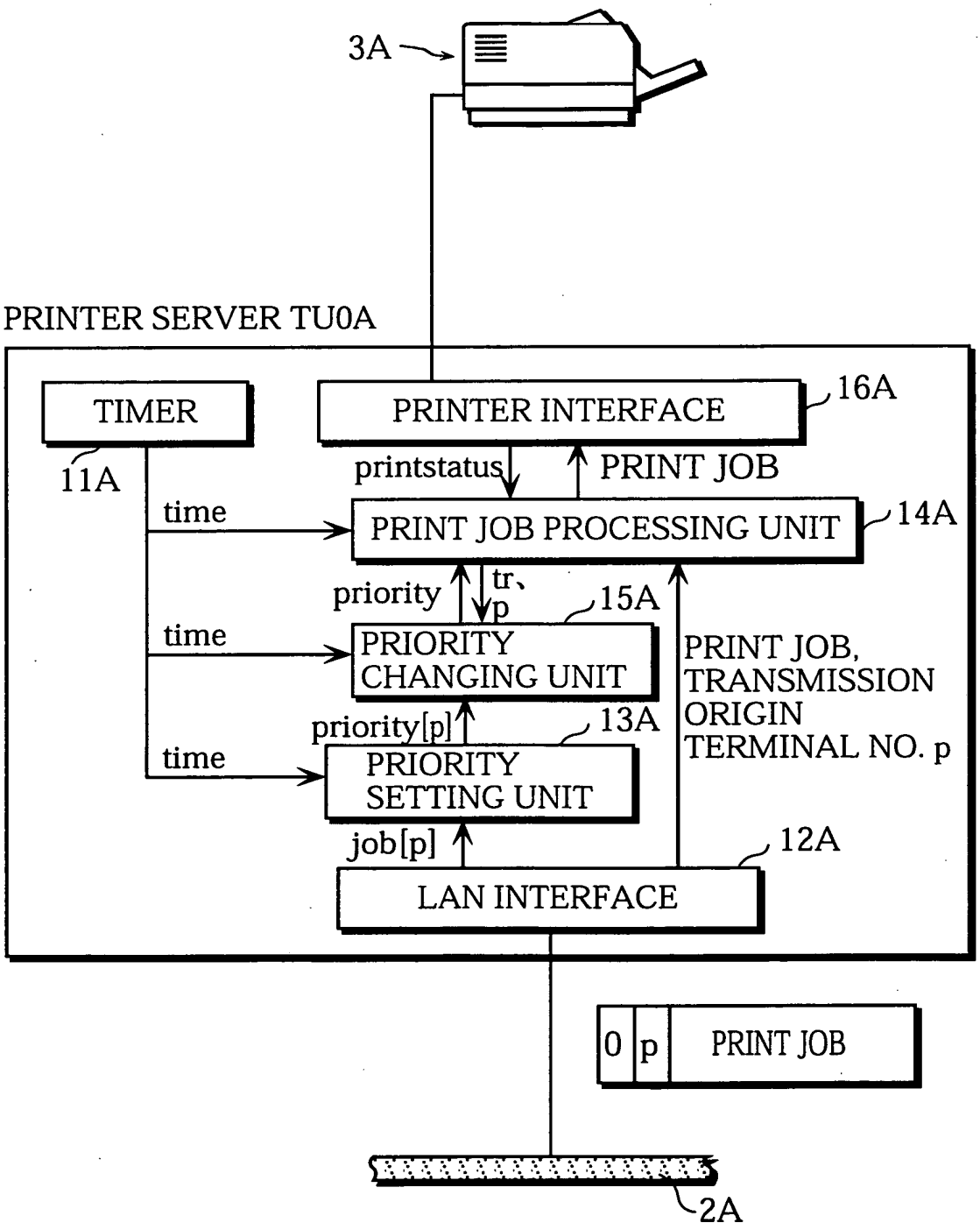

3A
PRINTER SERVER TU0A
TIMER
11A
PRINTER INTERFACE
16A
printstatus
PRINT JOB
time
PRINT JOB PROCESSING UNIT
14A
priority
tr、p
15A
time
PRIORITY CHANGING UNIT
PRINT JOB, TRANSMISSION ORIGIN TERMINAL NO. p
priority[p]
13A
time
PRIORITY SETTING UNIT
job[p]
12A
LAN INTERFACE
0
p
PRINT JOB
2A

FIG. 16

PRIORITY STORAGE TABLE 131A

TERMINAL NO.	RECEPTION TIME (tl)	EXPIRED TIME (tk)	PRIORITY LEVEL (priority)
1			
2			
3			
p			
P			

FIG. 17

PRINT JOB BUFFER 141A

BUFFER NO.	FLAG (ON/OFF)	PRINT JOB	TERMINAL NO. (p)	RECEPTION TIME (tr)	PRIORITY LEVEL(priority)
1					
2					
3					
n					
N					

FIG.18

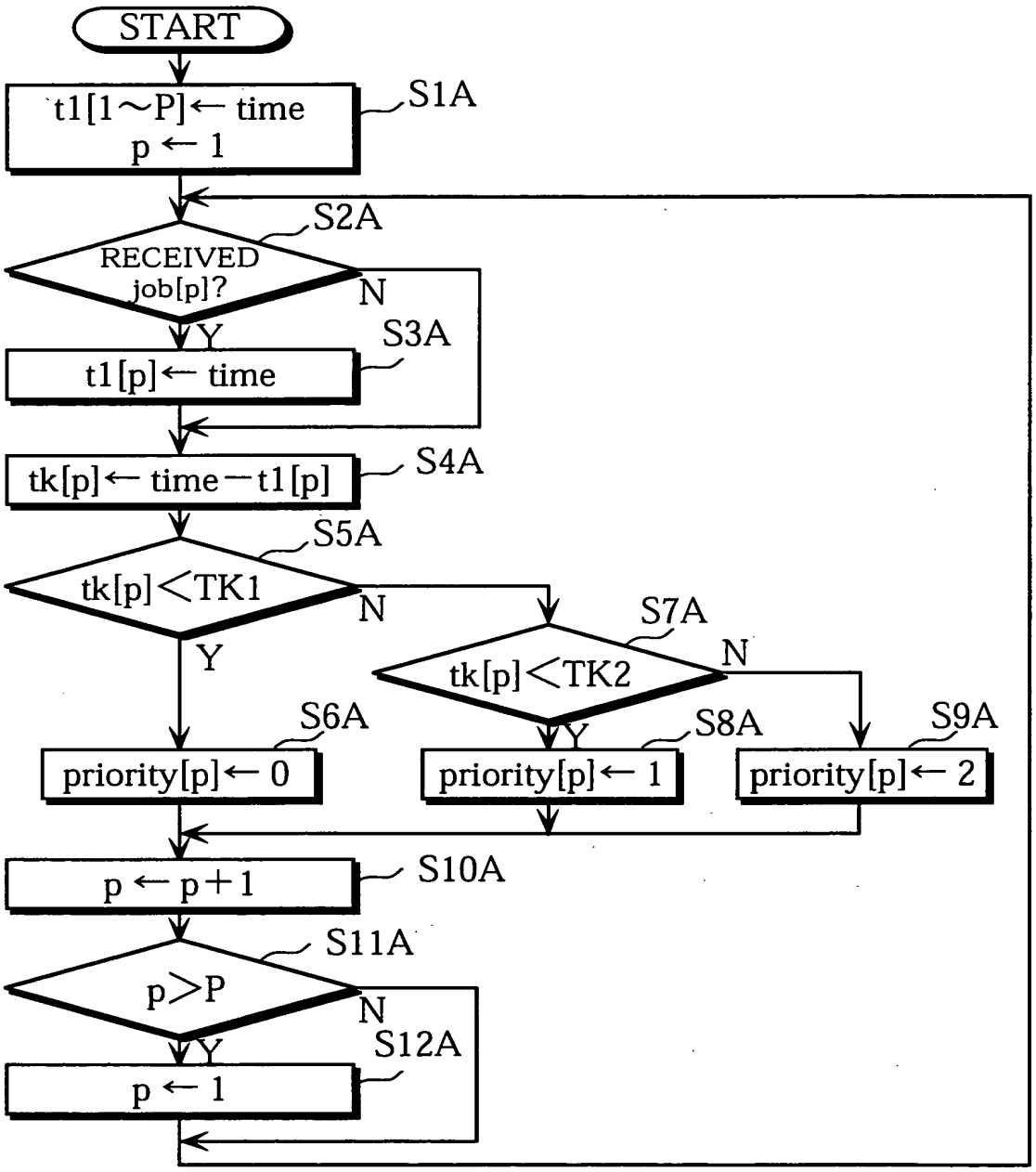

START
t1[1～P]← time
p ← 1
S1A
S2A
RECEIVED job[p]?
N
Y
S3A
t1[p]← time
tk[p]← time－t1[p]
S4A
S5A
tk[p]＜TK1
N
Y
S7A
tk[p]＜TK2
N
Y
S6A
S8A
S9A
priority[p]← 0
priority[p]← 1
priority[p]← 2
p ← p+1
S10A
S11A
p＞P
N
Y
S12A
p ← 1

FIG. 19

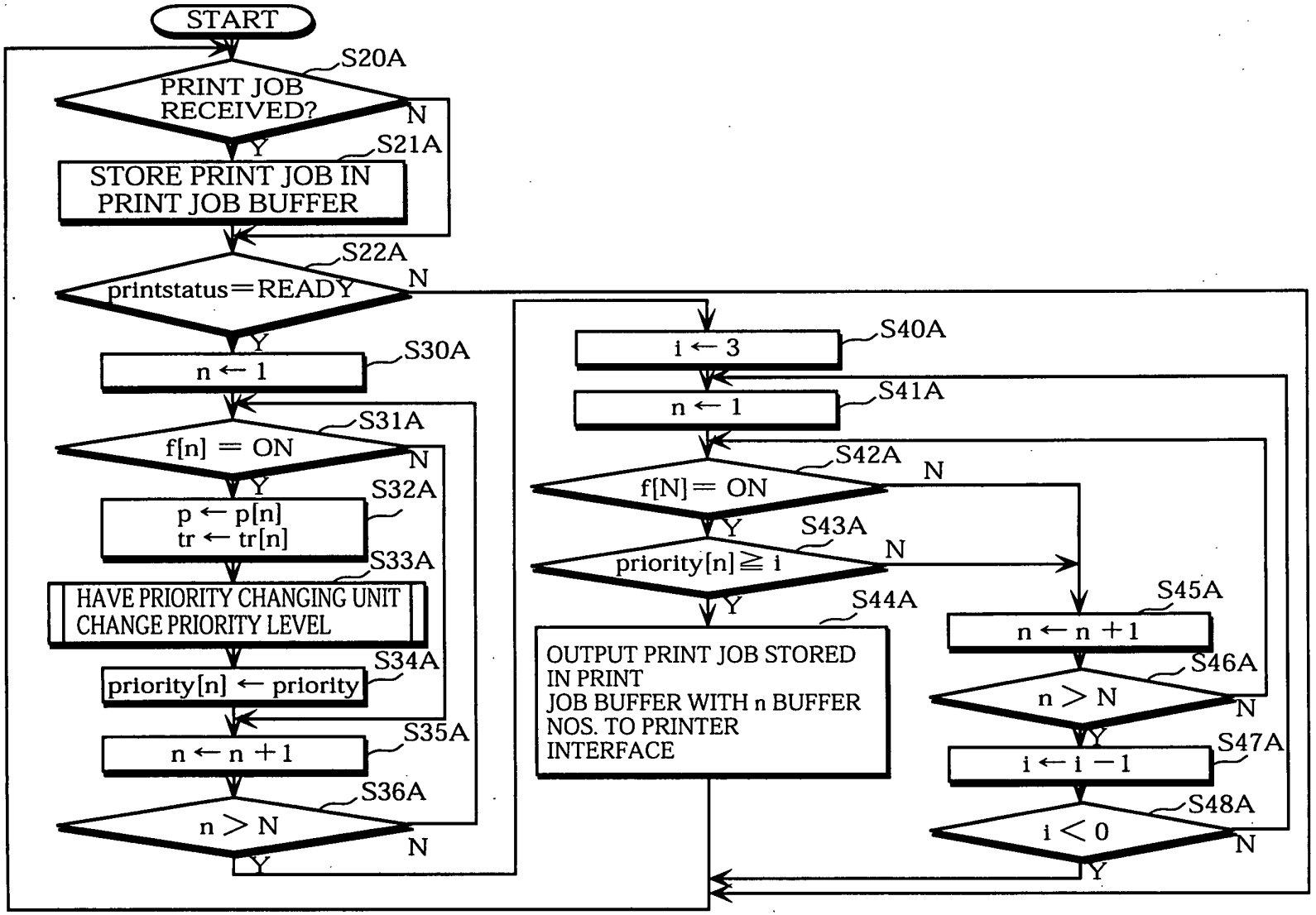

START
S20A
PRINT JOB RECEIVED?
N
Y
S21A
STORE PRINT JOB IN PRINT JOB BUFFER
S22A
printstatus=READY
N
Y
S30A
n ← 1
S31A
f[n] = ON
N
Y
S32A
p ← p[n]
tr ← tr[n]
S33A
HAVE PRIORITY CHANGING UNIT CHANGE PRIORITY LEVEL
S34A
priority[n] ← priority
S35A
n ← n + 1
S36A
n > N
N
Y
S40A
i ← 3
S41A
n ← 1
S42A
f[N]= ON
N
Y
S43A
priority[n] ≧ i
N
Y
S44A
OUTPUT PRINT JOB STORED IN PRINT JOB BUFFER WITH n BUFFER NOS. TO PRINTER INTERFACE
S45A
n ← n + 1
S46A
n > N
N
Y
S47A
i ← i − 1
S48A
i < 0
N
Y

FIG. 20

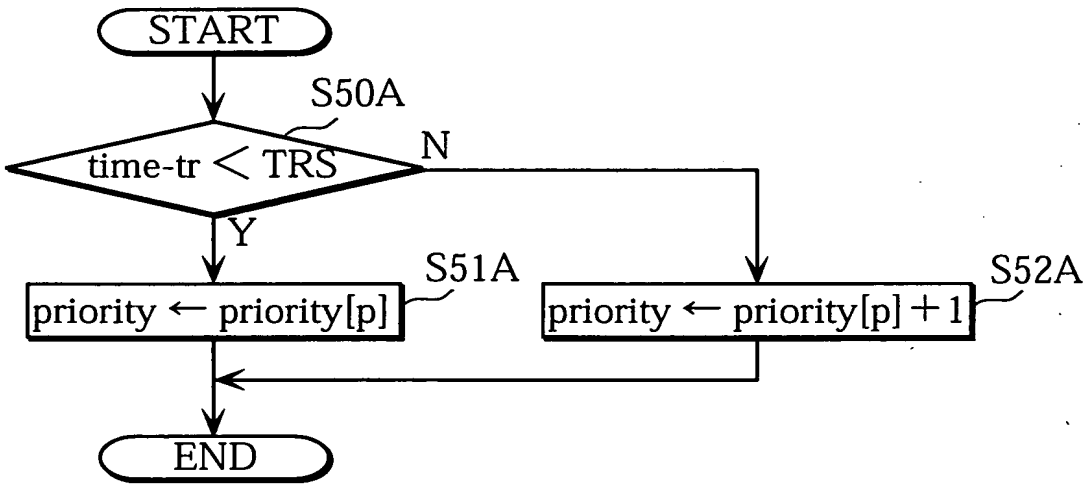

START
S50A
time-tr < TRS
N
Y
S51A
priority ← priority[p]
S52A
priority ← priority[p] + 1
END

FIG.21

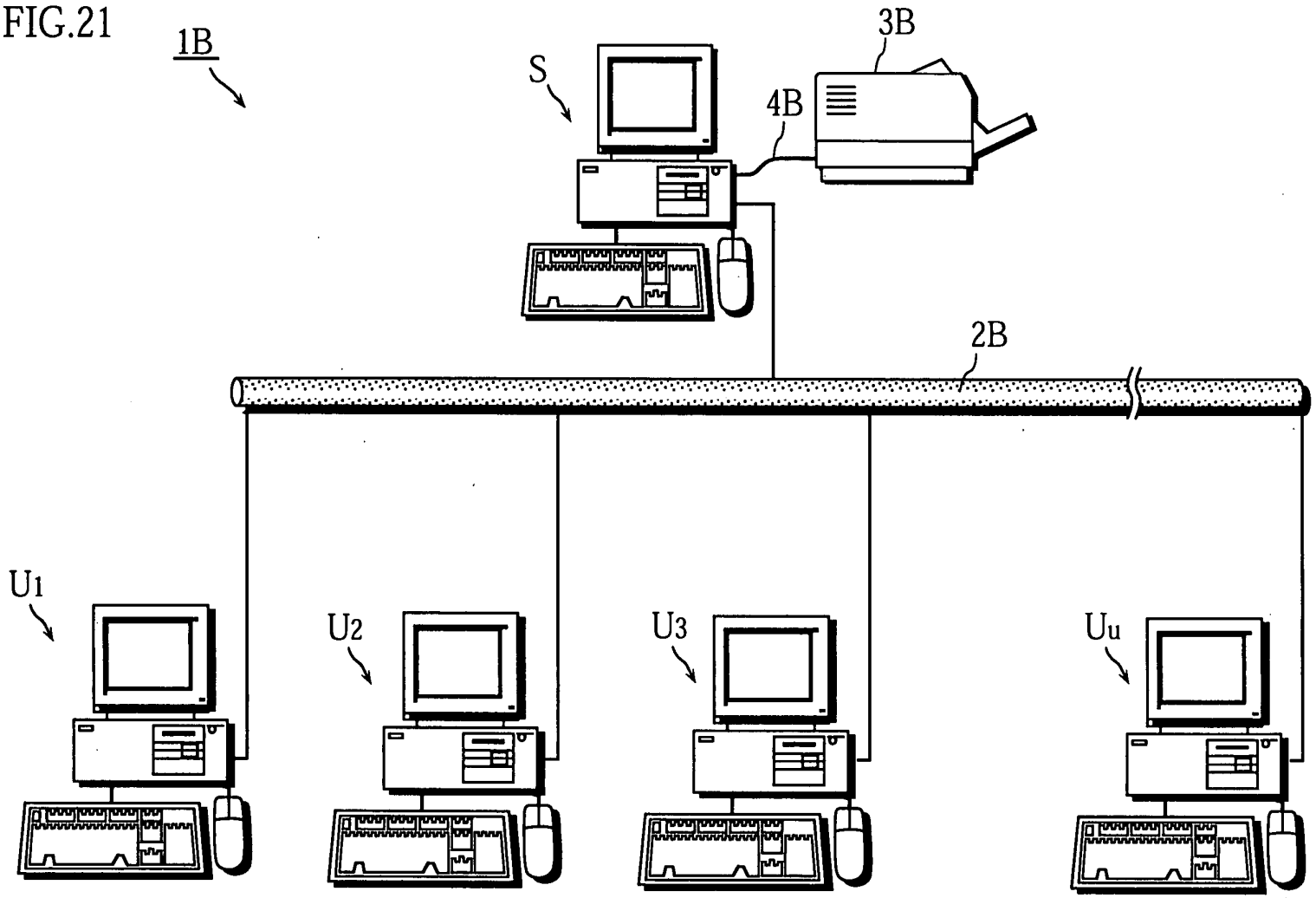


FIG. 22

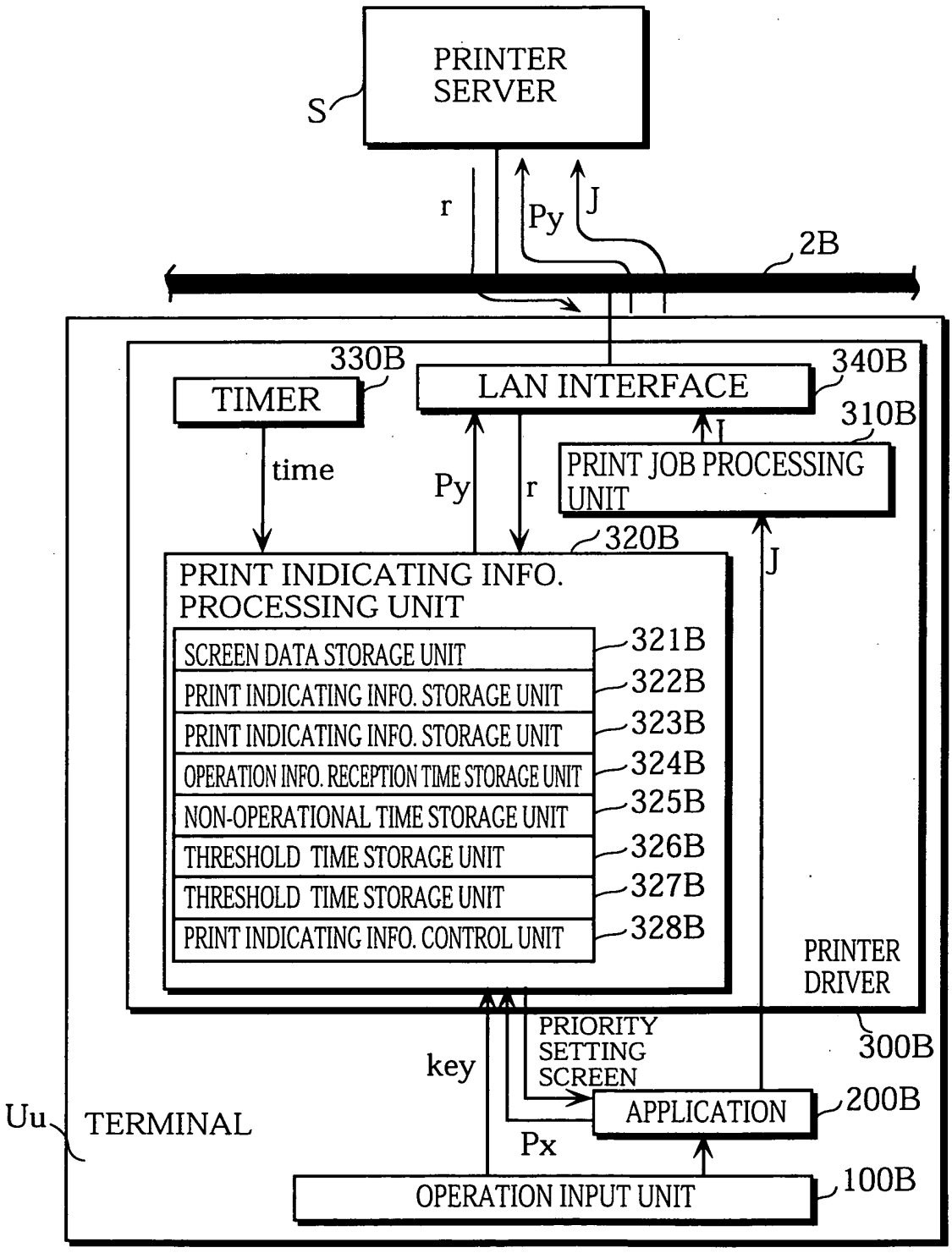

PRINTER SERVER
S
r
Py
J
2B
330B
TIMER
LAN INTERFACE
340B
310B
PRINT JOB PROCESSING UNIT
time
Py
r
320B
J
PRINT INDICATING INFO. PROCESSING UNIT
SCREEN DATA STORAGE UNIT
321B
PRINT INDICATING INFO. STORAGE UNIT
322B
PRINT INDICATING INFO. STORAGE UNIT
323B
OPERATION INFO. RECEPTION TIME STORAGE UNIT
324B
NON-OPERATIONAL TIME STORAGE UNIT
325B
THRESHOLD TIME STORAGE UNIT
326B
THRESHOLD TIME STORAGE UNIT
327B
PRINT INDICATING INFO. CONTROL UNIT
328B
PRINTER DRIVER
300B
PRIORITY SETTING SCREEN
key
APPLICATION
200B
Uu
TERMINAL
Px
OPERATION INPUT UNIT
100B

FIG. 23

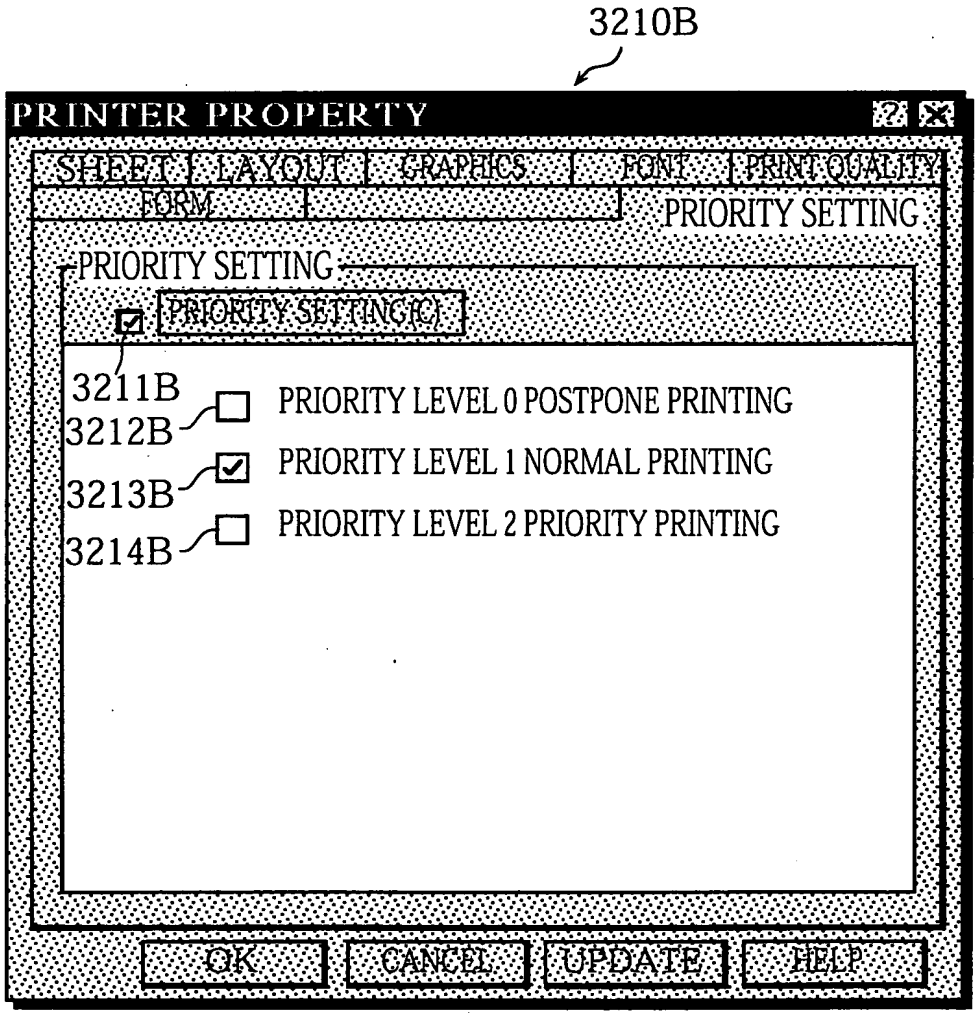

3210B
PRINTER PROPERTY
SHEET
LAYOUT
GRAPHICS
FONT
PRINT QUALITY
FORM
PRIORITY SETTING
PRIORITY SETTING
PRIORITY SETTING(C)
3211B
3212B
PRIORITY LEVEL 0 POSTPONE PRINTING
3213B
PRIORITY LEVEL 1 NORMAL PRINTING
3214B
PRIORITY LEVEL 2 PRIORITY PRINTING
OK
CANCEL
UPDATE
HELP

FIG.24

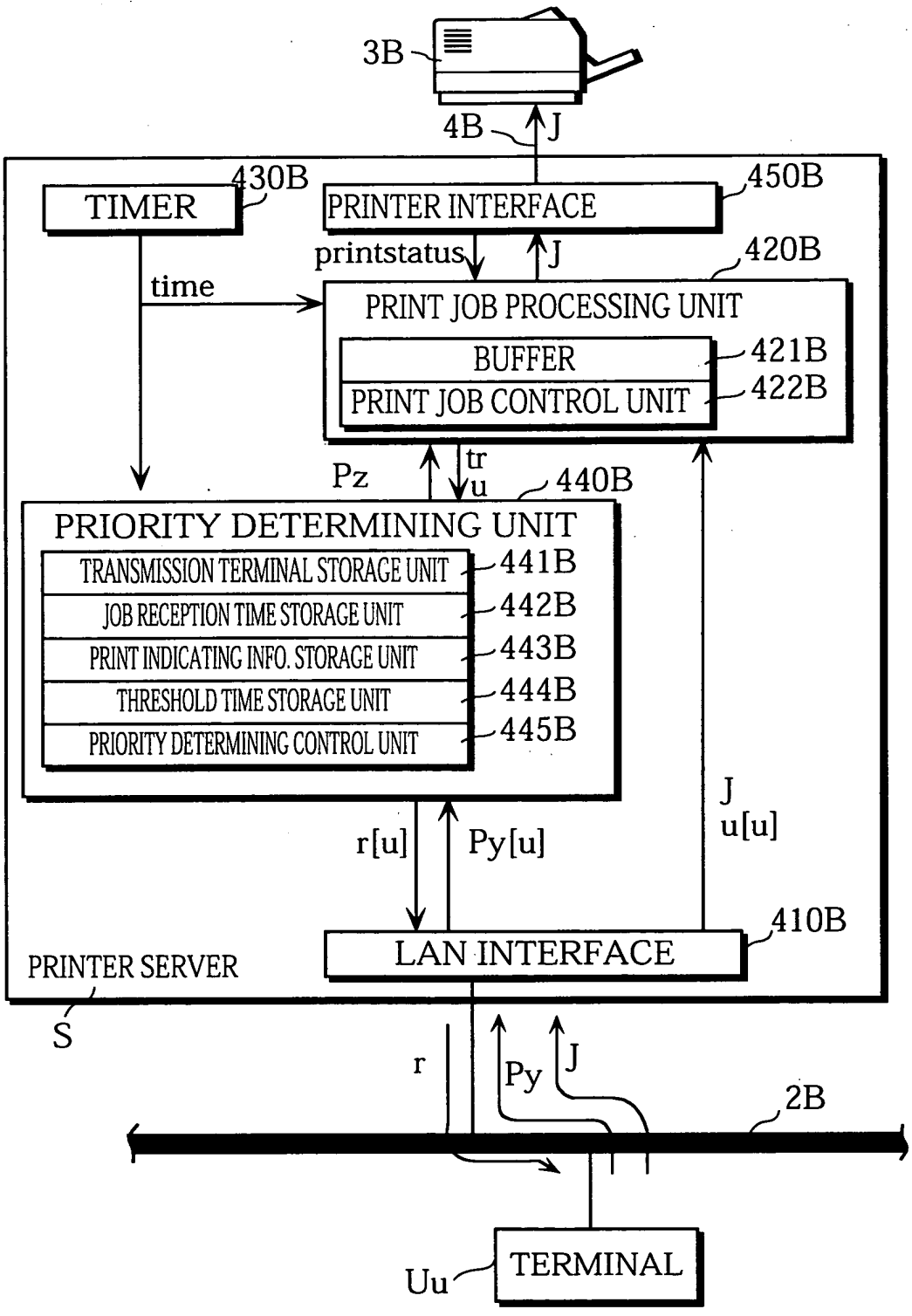

3B
4B
J
TIMER
430B
PRINTER INTERFACE
450B
printstatus
J
420B
time
PRINT JOB PROCESSING UNIT
BUFFER
421B
PRINT JOB CONTROL UNIT
422B
Pz
tr
u
440B
PRIORITY DETERMINING UNIT
TRANSMISSION TERMINAL STORAGE UNIT
441B
JOB RECEPTION TIME STORAGE UNIT
442B
PRINT INDICATING INFO. STORAGE UNIT
443B
THRESHOLD TIME STORAGE UNIT
444B
PRIORITY DETERMINING CONTROL UNIT
445B
J
u[u]
r[u]
Py[u]
410B
LAN INTERFACE
PRINTER SERVER
S
r
Py
J
2B
Uu
TERMINAL

FIG. 25

421B

BUFFER NO. n	JOB BODY J[n]	TRANSMISSION TERMINAL NO. U[n]	JOB RECEPTION TIME tr[n]	FLAG f[n]	PRIORITY LEVEL Pz[n]
1					
2					
3					
	⋮				
N					

FIG.26

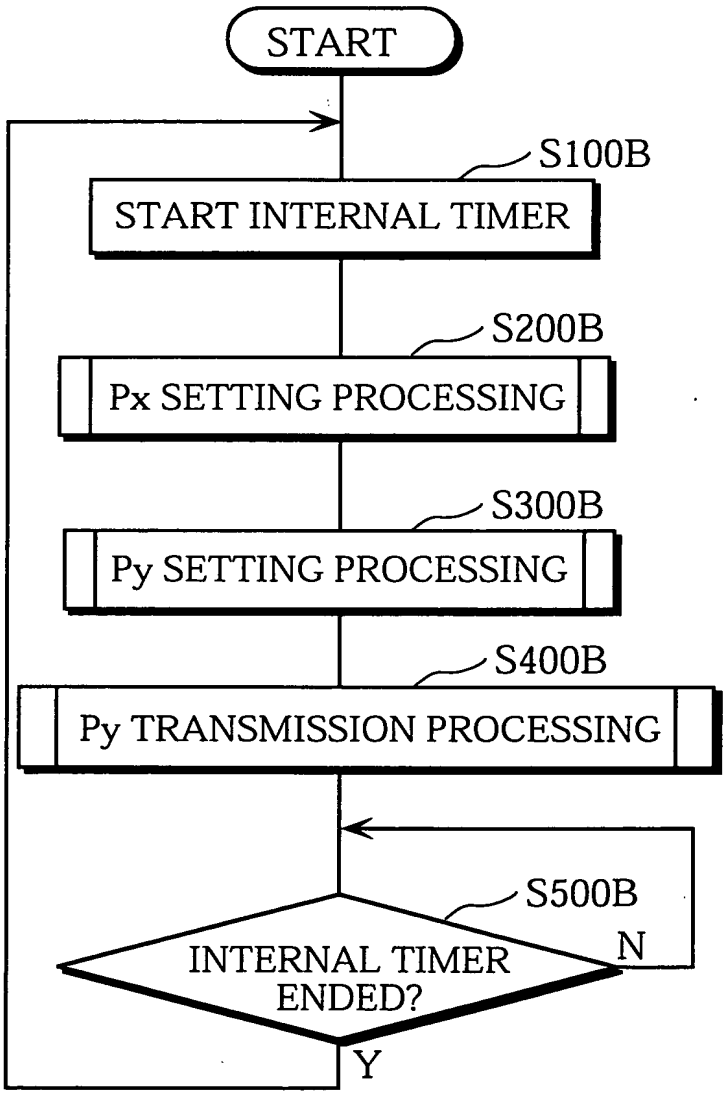

START
S100B
START INTERNAL TIMER
S200B
Px SETTING PROCESSING
S300B
Py SETTING PROCESSING
S400B
Py TRANSMISSION PROCESSING
S500B
INTERNAL TIMER ENDED?
N
Y

FIG. 27

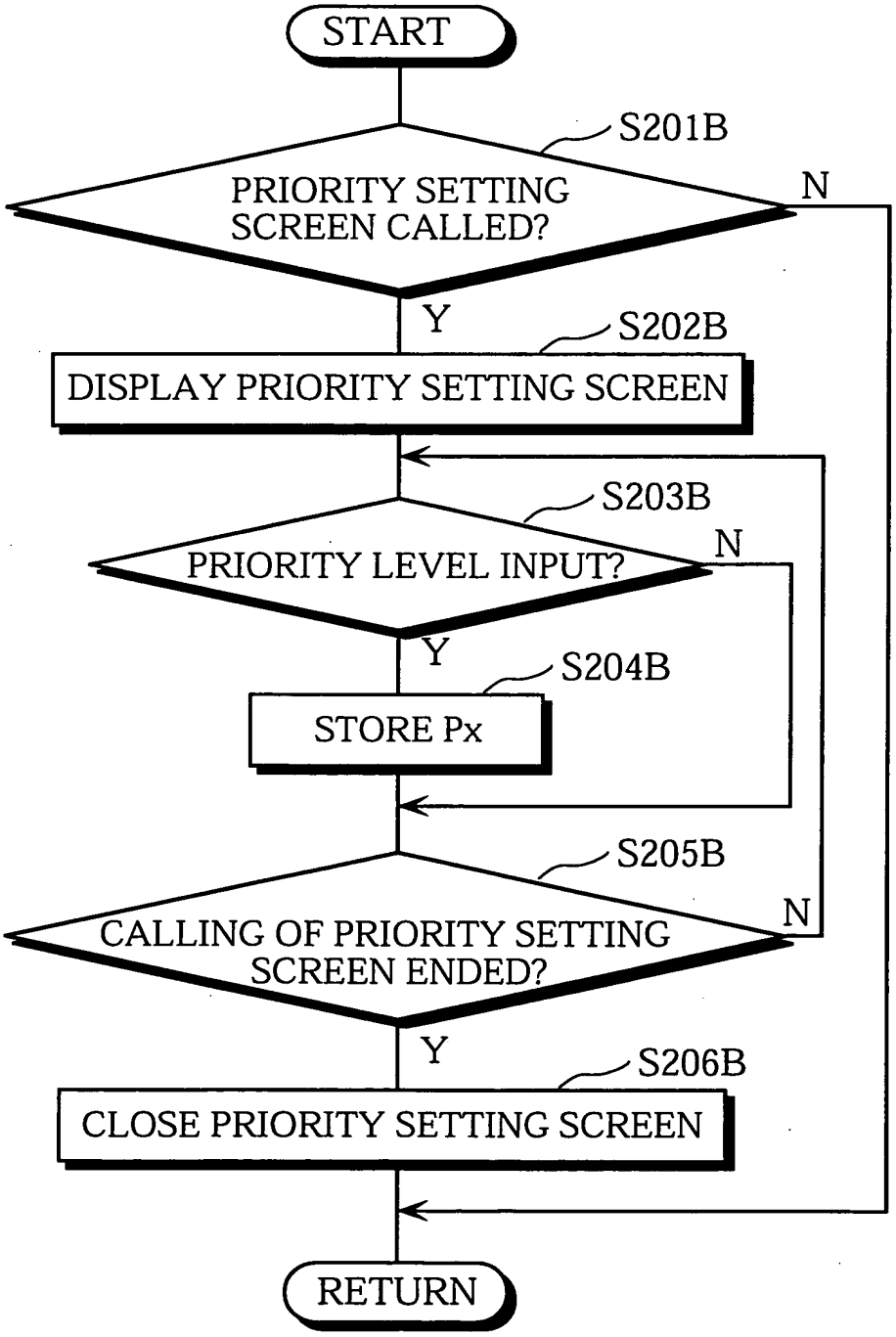

START
S201B
PRIORITY SETTING SCREEN CALLED?
N
Y
S202B
DISPLAY PRIORITY SETTING SCREEN
S203B
PRIORITY LEVEL INPUT?
N
Y
S204B
STORE Px
S205B
CALLING OF PRIORITY SETTING SCREEN ENDED?
N
Y
S206B
CLOSE PRIORITY SETTING SCREEN
RETURN

FIG.28

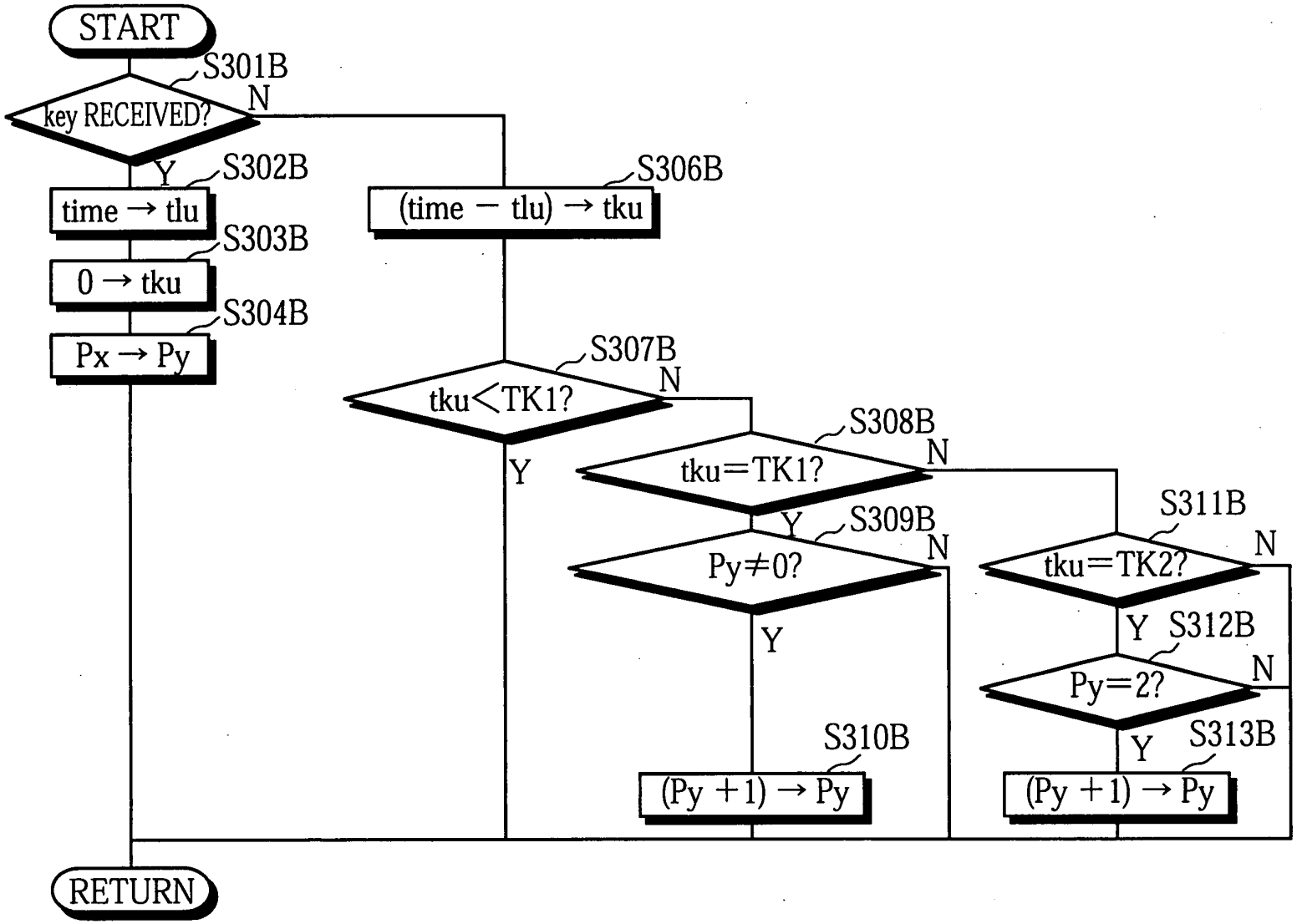

START
S301B
key RECEIVED?
N
Y
S302B
time → tlu
S303B
0 → tku
S304B
Px → Py
S306B
(time − tlu) → tku
S307B
tku<TK1?
N
Y
S308B
tku=TK1?
N
Y
S309B
Py≠0?
N
Y
S310B
(Py +1) → Py
S311B
tku=TK2?
N
Y
S312B
Py=2?
N
Y
S313B
(Py +1) → Py
RETURN

FIG. 29

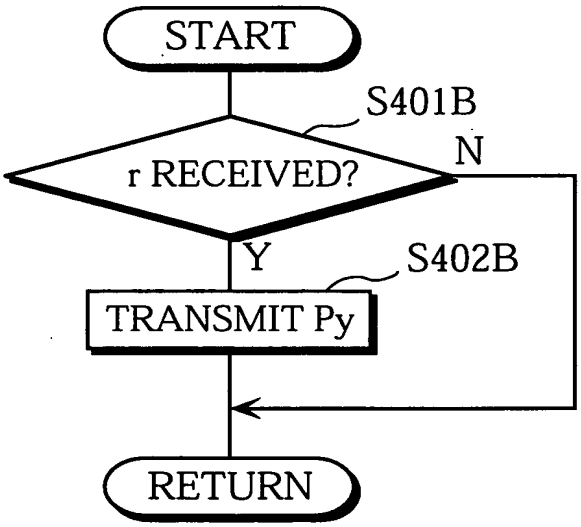


FIG. 30

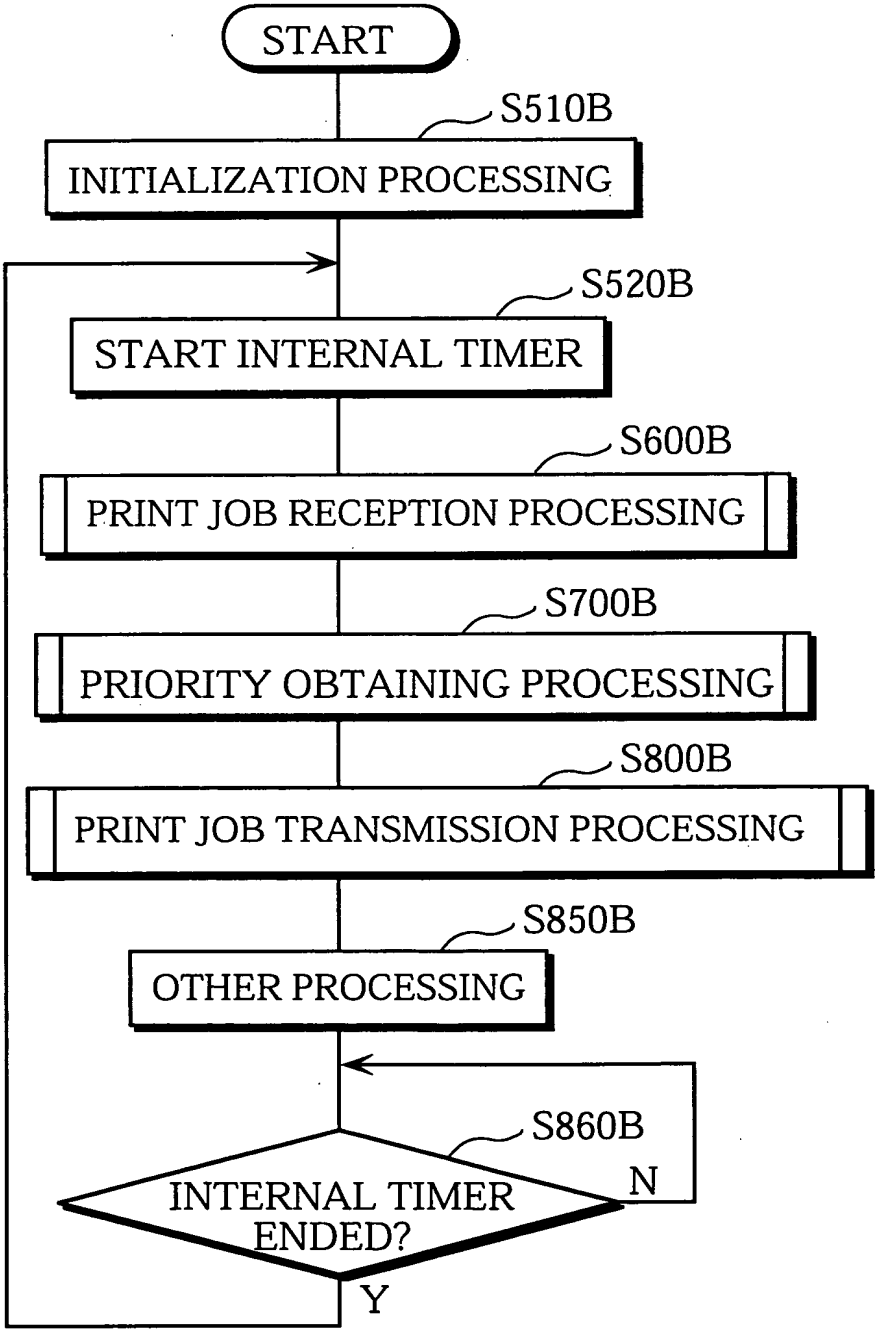

START
S510B
INITIALIZATION PROCESSING
S520B
START INTERNAL TIMER
S600B
PRINT JOB RECEPTION PROCESSING
S700B
PRIORITY OBTAINING PROCESSING
S800B
PRINT JOB TRANSMISSION PROCESSING
S850B
OTHER PROCESSING
S860B
INTERNAL TIMER ENDED?
N
Y

FIG. 31

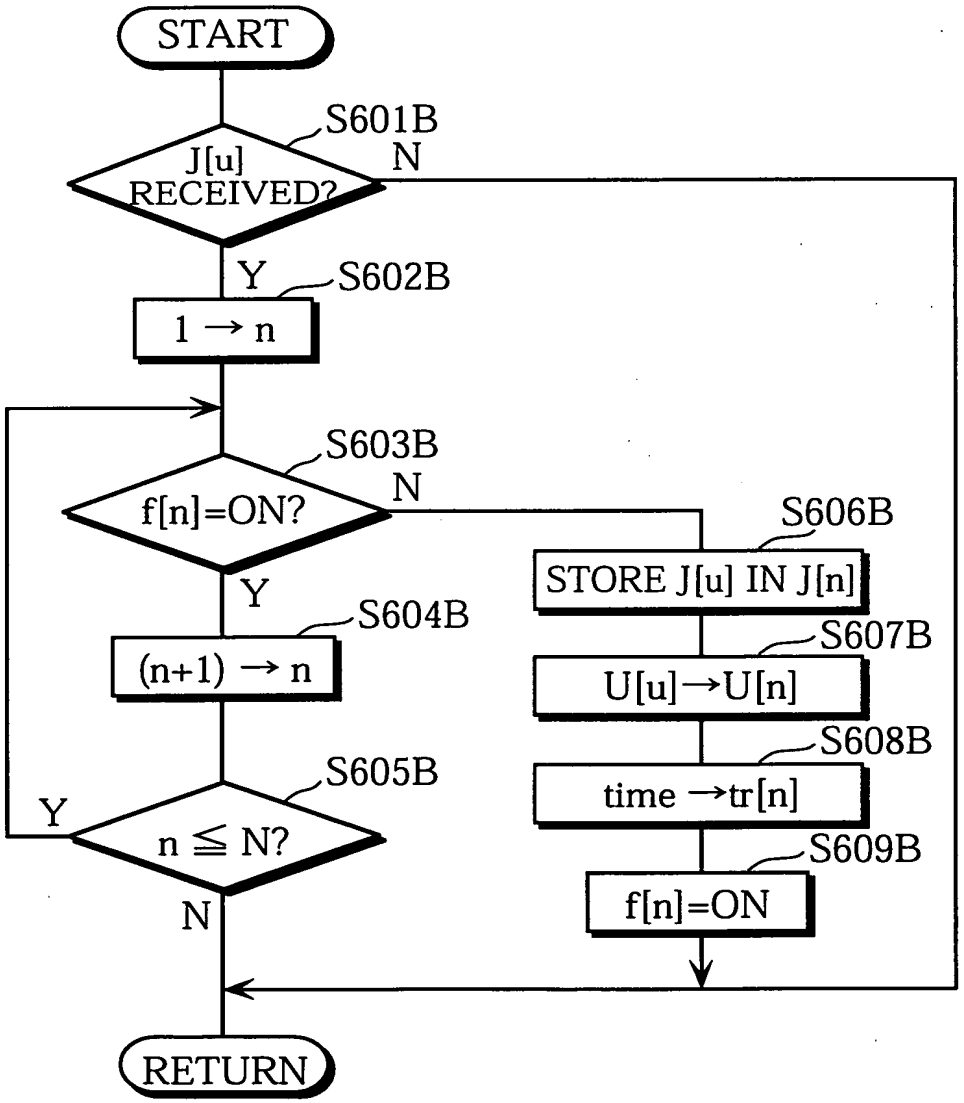

START
S601B
J[u] RECEIVED?
N
Y
S602B
1 → n
S603B
f[n]=ON?
N
Y
S604B
(n+1) → n
S605B
n ≦ N?
Y
N
RETURN
S606B
STORE J[u] IN J[n]
S607B
U[u]→U[n]
S608B
time →tr[n]
S609B
f[n]=ON

FIG. 32

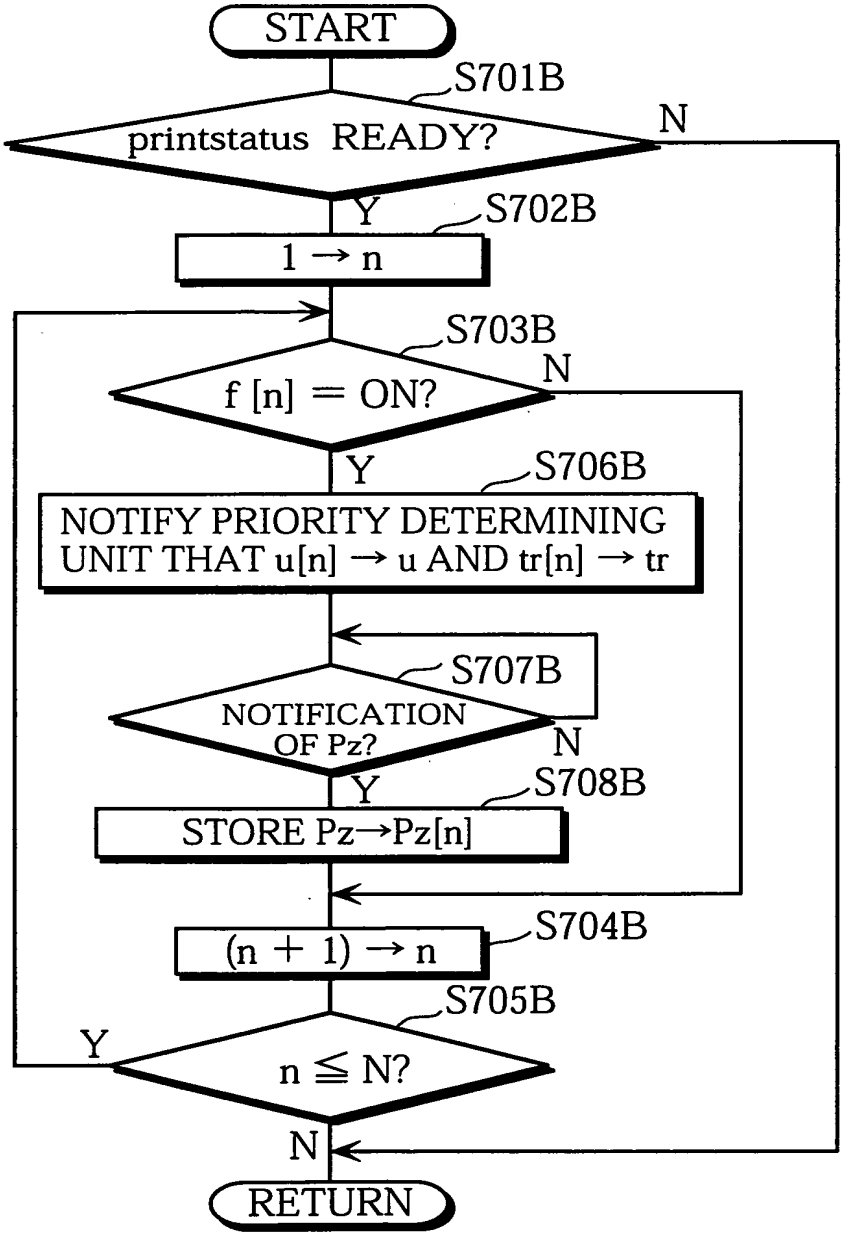

START
S701B
printstatus READY?
N
Y
S702B
1 → n
S703B
f [n] = ON?
N
Y
S706B
NOTIFY PRIORITY DETERMINING UNIT THAT u[n] → u AND tr[n] → tr
S707B
NOTIFICATION OF Pz?
N
Y
S708B
STORE Pz→Pz[n]
S704B
(n + 1) → n
S705B
n ≦ N?
Y
N
RETURN

FIG. 33

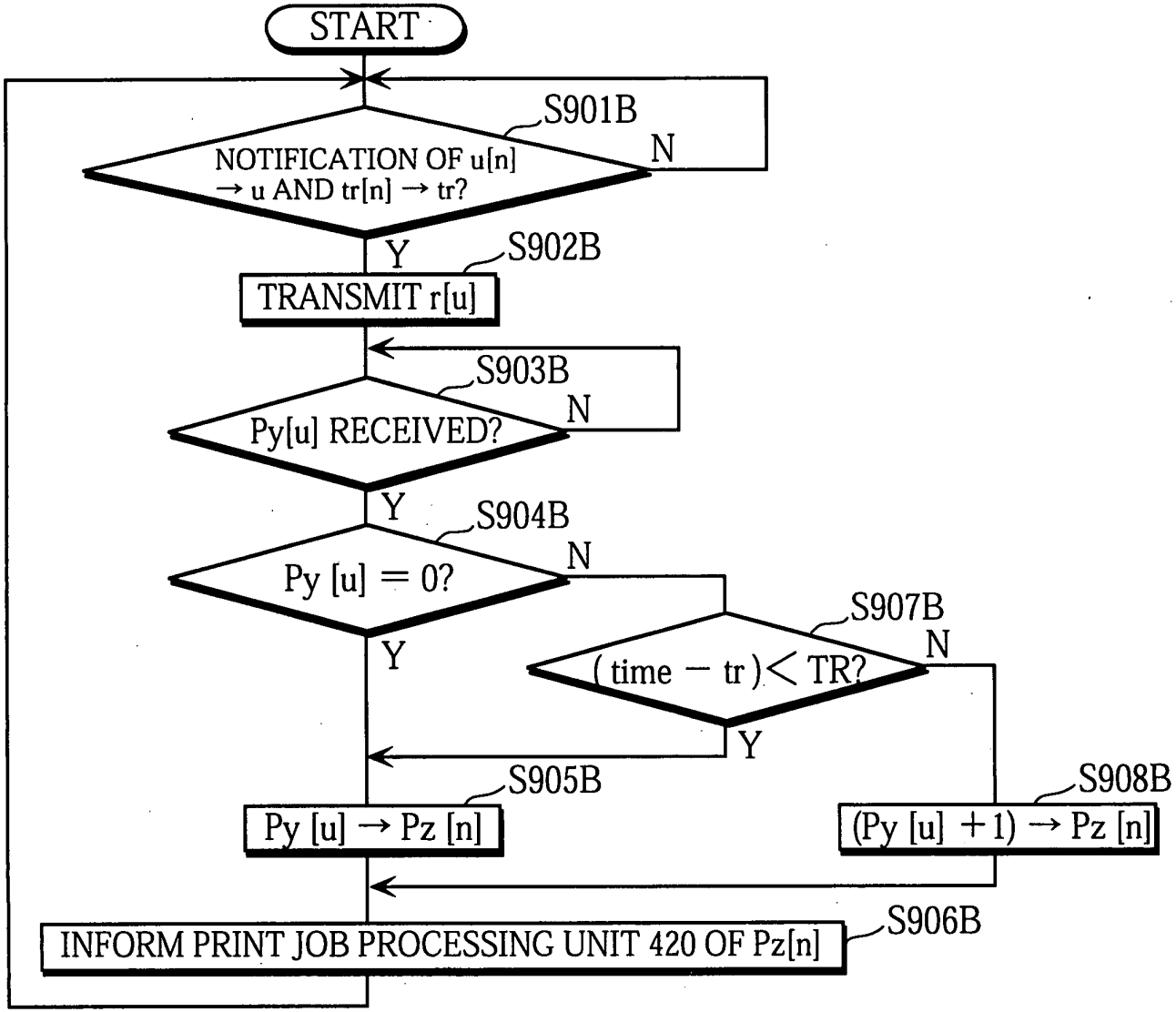
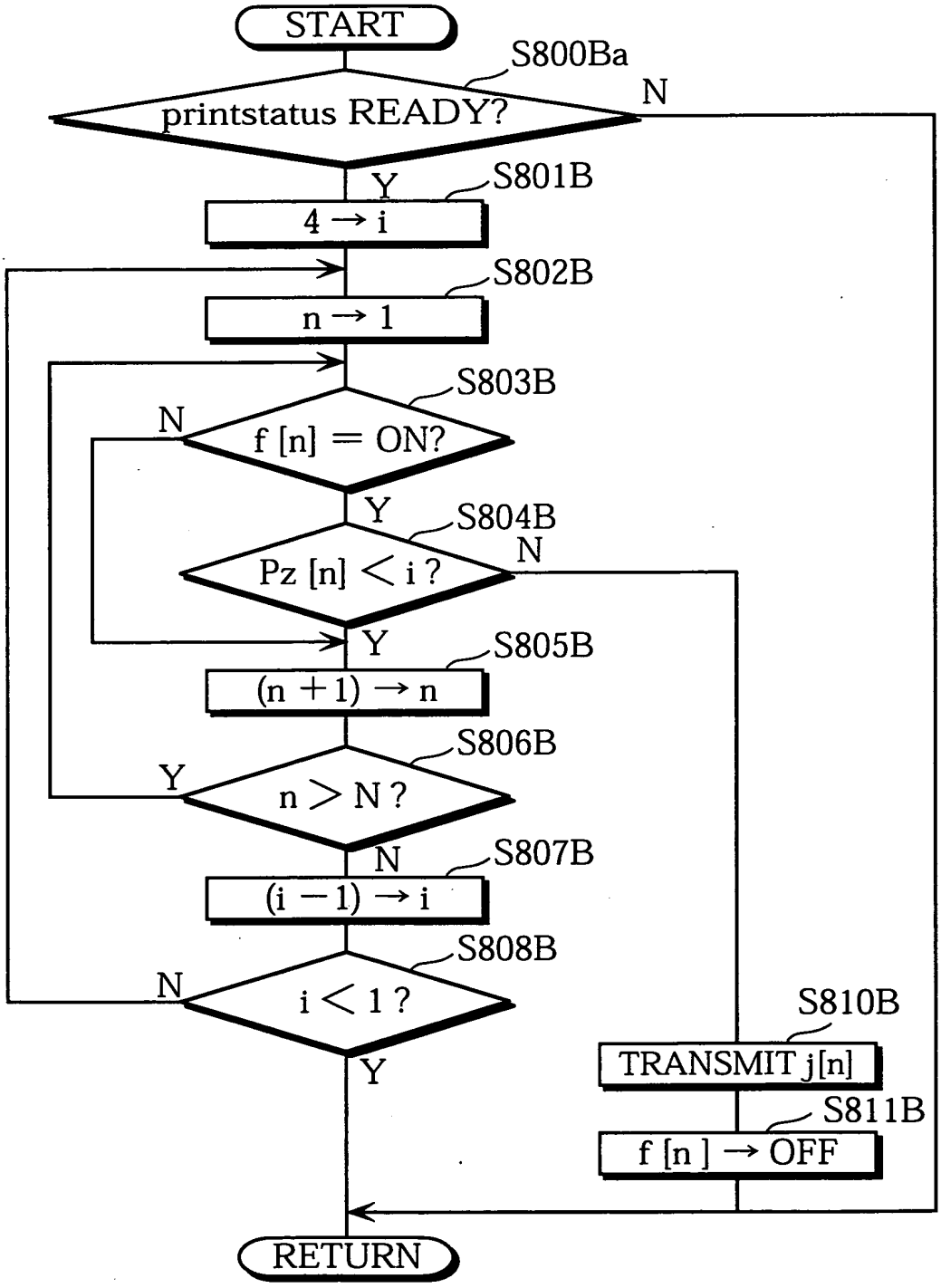

START
S901B
NOTIFICATION OF u[n] → u AND tr[n] → tr?
N
Y
S902B
TRANSMIT r[u]
S903B
Py[u] RECEIVED?
N
Y
S904B
Py [u] = 0?
N
Y
S907B
(time − tr) < TR?
N
Y
S905B
Py [u] → Pz [n]
S908B
(Py [u] +1) → Pz [n]
S906B
INFORM PRINT JOB PROCESSING UNIT 420 OF Pz[n]

FIG. 34


START
S800Ba
printstatus READY?
N
Y
S801B
4 → i
S802B
n → 1
S803B
N
f [n] = ON?
Y
S804B
Pz [n] < i ?
N
Y
S805B
(n + 1) → n
S806B
Y
n > N ?
N
S807B
(i − 1) → i
S808B
N
i < 1 ?
Y
S810B
TRANSMIT j[n]
S811B
f [n] → OFF
RETURN

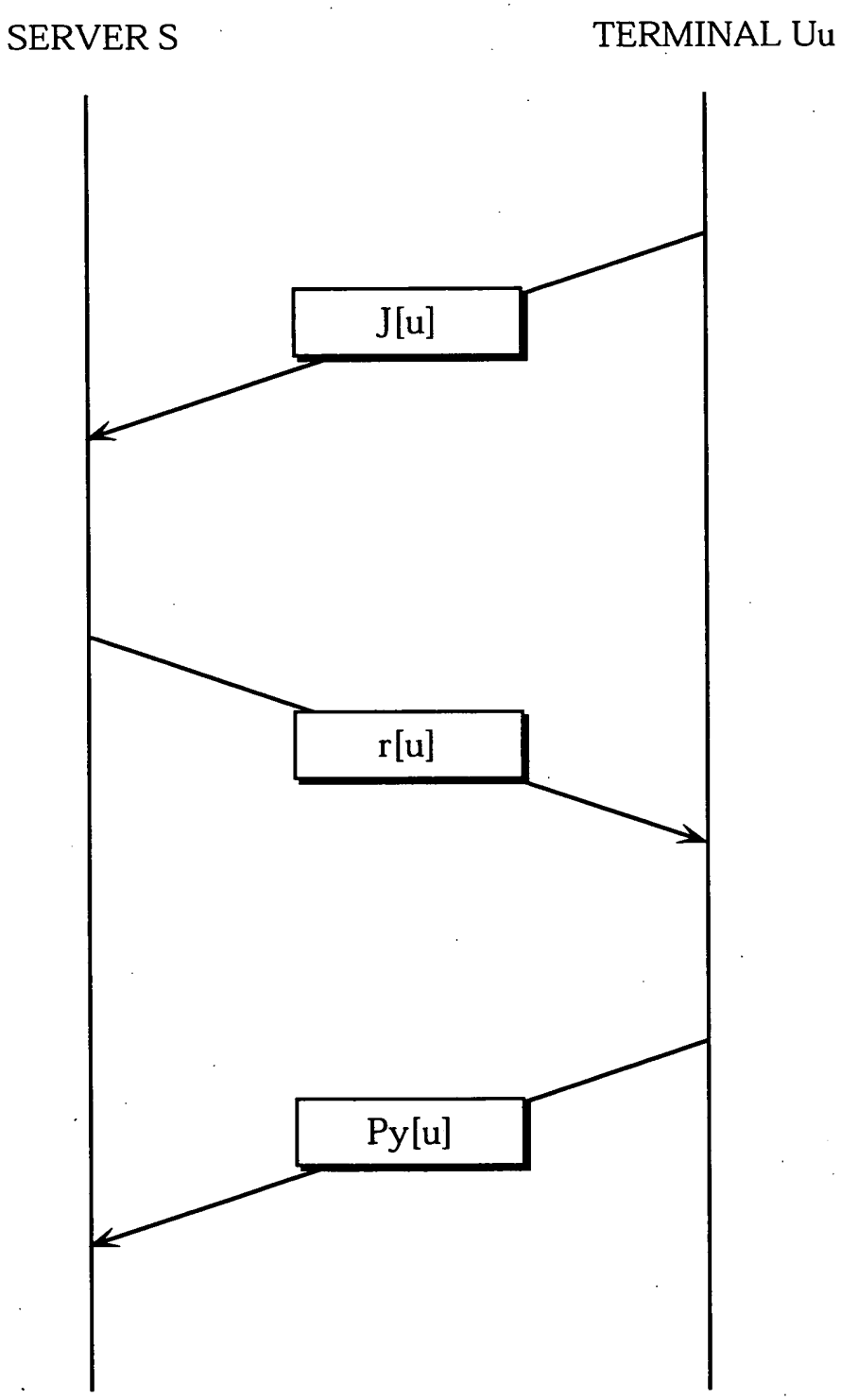



FIG. 35